WHAT IS CLAIMED IS:

1. A cleaning solution capable of selectively removing a damaged portion of a ferroelectric layer, the cleaning solution comprising:

a fluoride;

an organic acid with carboxyl group;

an alkaline pH adjusting agent; and

water.

2. The cleaning solution of claim 1, wherein the pH of the cleaning solution is about 4.5 to about 6.0.

3. The cleaning solution of claim 1, wherein the fluoride is hydrogen fluoride, hydroboron tetrafluoride or ammonium fluoride.

4. The cleaning solution of claim 1, wherein the organic acid is formic acid, acetic acid or citric acid.

5. The cleaning solution of claim 1, wherein the alkaline pH adjusting agent is ammonium hydroxide, potassium hydroxide, tetramethylammonium hydroxide or tetraethylammonium hydroxide.

6. The cleaning solution of claim 1, wherein the content of the fluoride is about 0.01% to about 1% by weight based on the total weight of the cleaning solution.

7. The cleaning solution of claim 1, wherein the content of the organic acid with carboxyl group is about 1% to about 50% by weight based on the total weight of the cleaning solution.

8. The cleaning solution of claim 1, wherein the content of the alkali pH adjusting agent is about 0.25% to about 15% by weight based on the total weight of the cleaning solution.

9. The cleaning solution of claim 1, wherein the damaged portion of the ferroelectric layer to be removed with the cleaning solution includes the surface of the ferroelectric layer passed through annealing after deposition, or the surface of the ferroelectric layer passed through an etching process.

10. A method of selectively removing a damaged portion of a ferroelectric layer with a cleaning solution, the method comprising:

providing an integrated circuit substrate having an exposed ferroelectric layer with the damaged portion; and

contacting the exposed ferroelectric layer with the cleaning solution, said cleaning solution including a fluoride, an organic acid with carboxyl group, an alkaline pH adjusting agent, and water.

11. The method of claim 10, wherein the exposed ferroelectric layer includes the surface of the ferroelectric layer passed through annealing after deposition on the integrated circuit substrate, and the step of making the exposed ferroelectric layer contact the cleaning solution includes etching back the ferroelectric layer by about 100 Å to about 500 Å from the top of the ferroelectric layer.

12. The method of claim 10, wherein the exposed ferroelectric layer is interposed between upper and lower electrode layers, and the method further comprises forming a capacitor by patterning the upper electrode layer, the ferroelectric layer and the lower electrode layer, before contacting the exposed ferroelectric layer with the cleaning solution.

13. The method of claim 10, wherein the pH of the cleaning solution is about 4.5 to about 6.0.

14. The method of claim 10, wherein the fluoride is hydrogen fluoride, hydroboron tetrafluoride or ammonium fluoride.

15. The method of claim 10, wherein the organic acid is formic acid, acetic acid or citric acid.

16. The method of claim 10, wherein the alkaline pH adjusting agent is ammonium hydroxide, potassium hydroxide, tetramethylammonium hydroxide or tetraethylammonium hydroxide.

17. The method of claim 10, wherein the content of the fluoride is about 0.01% to about 1% by weight based on the total weight of the cleaning solution.

18. The method of claim 10, wherein the content of the organic acid with carboxyl group is about 1% to about 50% by weight based on the total weight of the cleaning solution.

19. The method of claim 10, wherein the content of the alkali pH adjusting agent is about 0.25 % to about 15% by weight based on the total weight of the cleaning solution.